

CLAIMS

1. A method for selecting a gateway network node for a mobile station (MS1, MS2) served by a serving network node (SGSN1), in a system where at least two network operators may share a radio network (UTRAN1) and the serving network node (SGSN1), the system comprising at least two gateway network nodes (GGSN1, GGSN2), **characterized** by the system

maintaining partner information about predefined partner networks (PLMN1, PLMN2), the partner information indicating that said network operators share the serving network node (SGSN1); and

selecting a gateway network node (GGSN1, GGSN2) for the mobile station on the basis of the partner information.

2. A method according to claim 1, **characterized** in that the partner information comprises direct or indirect indications of the network in which the mobile station is located (MS1, MS2); and of

the home network of the mobile station (MS1, MS2).

3. A method according to claim 1 or 2, **characterized** in that the selection step of the method comprises the steps of

checking on the basis of the partner information whether a mobile station (MS) is in the home network, in a predefined partner network of the home network, or in a network outside them; and

selecting the gateway network node (GGSN1) of the home network if the mobile station (MS) is in its home network;

selecting the gateway network node (GGSN2) of the home network if the mobile station (MS) is in a predefined partner network of the home network; or

selecting the gateway network node (GGSN1) of a visited network if the mobile station (MS) is outside its home network or predefined partner mobile networks of its home network.

4. A method according to claim 1 or 2, **characterized** in that the selection step of the method comprises the steps of

checking on the basis of the partner information whether the mobile station is in a network that is a predefined partner network of the one belonging to its home network operator; and

selecting the gateway network node (GGSN1) of a visited network if the mobile station (MS) is in a network that is a predefined partner network of the one belonging to its home network operator.

5 5. A mobile communications system comprising
at least one mobile station (MS1, MS2);
a subscriber register (HLR1, HLR2) for maintaining subscriber
information of the mobile station (MS1, MS2);

10 at least two networks (PLMN1, PLMN2) to which the mobile station
(MS1, MS2) may connect when it is within the area of the network, one of the
networks being the home network of the mobile station, the networks
comprising at least one gateway network node (GGSN1, GGSN2) for
interaction between packet switched mobile networks and external data
networks; and

15 at least one serving network node (SGSN1) for serving the mobile
station (MS1, MS2) while the mobile station is in the area of the serving
network node,

characterized in that the system is configured to
maintain partner information about networks that are predefined
partner networks of the home network, the home network sharing at least one
20 serving gateway node (SGSN1) with each of the predefined partner networks;
and to

 select the gateway network node (GGSN1, GGSN2) by utilizing the
partner information.

25 6. A system according to claim 5, **characterized** in that the
partner information is maintained in the serving network node (SGSN1) to
indicate the networks sharing the serving network node (SGSN1).

30 7. A system according to claim 6, **characterized** in that the
serving network node (SGSN1) is configured to compare the MNC/MCC code
of the mobile station (MS), in connection with the context activation of the
mobile station, with APN operator identifiers stored for each network operator
sharing the SGSN1, said MNC/MCC code indicating explicitly the home
network of the mobile station and said APN operator identifier indicating
implicitly the partner information.

35 8. A system according to any one of claims 5, 6 or 7,
characterized in that the serving network node (SGSN1) is also
configured to connect a mobile station (MS) located in a mobile network that is

a predefined partner network of its home network to the gateway network node (GGSN2) of the home network.

9. A system according to claim 5, **characterized** in that the partner information is maintained in a subscriber register (HLR1, HLR2).

5 10. A system according to claim 9, **characterized** in that the subscriber register (HLR) is configured to

check the partner information in connection with the location update of the mobile station (MS);

10 set the value of a "Visitor-PLMN address allowed"-flag to 'No' if the mobile station (MS) is in a predefined partner network of the home network; and

indicate the value of the flag to the serving network node (SGSN1).

15 11. A system according to any one of claims 5, 9 or 10, **characterized** in that the serving network node (SGSN1) is also configured to connect the mobile station (MS) located in a predefined partner network of its home network to the gateway network node (GGSN2) of the home network.

20 12. A system according to claim 5 or 9, **characterized** in that the subscriber register (HLR) is configured to

check the partner information in connection with the location update of the mobile station (MS), the partner information comprising at least one network belonging to the home network operator;

25 set value of the "Visitor-PLMN address allowed"-flag to 'Yes' if the mobile station (MS) is located in a network that is a predefined partner network of the one belonging to its home network operator; and

indicate the value of the flag to the serving network node (SGSN1).

30 13. A system according to any one of claims 5, 9 or 12, **characterized** in that the serving network node (SGSN1) is also configured to connect the mobile station (MS) located in a predefined partner network of the one belonging to its home network operator to the gateway network node (GGSN1) of the visited network on the basis of the partner information, the partner information comprising at least one network belonging to the home network operator.

35 14. A system according to claim 9, **characterized** in that the subscriber register (HLR1, HLR2) is configured to

compare the MNC/MCC code of the mobile station with APN operator identifiers stored for each network operator sharing the network in connection with the location update of the mobile station (MS); and

5 indicate the result of the comparison to the serving network node (SGSN1).

15. A subscriber register (HLR1, HLR2) for maintaining subscriber information in a system comprising

at least one mobile station,

10 at least two networks to which the mobile station may connect when it is within the area of the network, one of the networks being the home network of the mobile station, the networks comprising at least one gateway network node for interaction between packet switched mobile networks and external data networks; and

15 at least one serving network node for serving the mobile station while the mobile station is in the area of the serving network node,

characterized in that it comprises

a first routine for maintaining partner information about networks that are predefined partner networks of the network, the partner network and the home network sharing at least one serving gateway node;

20 a second routine for checking the partner information of the mobile station; and

a third routine for indicating, on the basis of the partner information, the gateway network node, to which the mobile station is to be connected, to the serving network node serving the mobile station.

25 16. A serving network node (SGSN1) for relaying packet switched data in a system comprising

at least one mobile station;

a subscriber register for maintaining subscriber information of the mobile station; and

30 at least two networks to which the mobile station may connect when it is within the area of the network, one of the networks being the home network of the mobile station, the networks comprising at least one gateway network node for interaction between packet switched mobile networks and external data networks,

35 **characterized** in that it comprises

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a first routine for checking partner information about networks that are predefined partner networks of the network, the partner network and the home network sharing the serving gateway node; and

5 a second routine for selecting a gateway network node on the basis of the partner information.

17. A network node according to claim 16, **characterized** in that it further comprises a third routine for maintaining partner information.

18. A network node according to claims 16 or 17, **characterized** in that it is the SGSN of a GPRS network.

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